INDEX TO THIRTEENTH VOLUME.

MISCELLANEOUS.

	PAGE
A Mixed Train	120
Along the Zigzag	56
America's Famous Bridges	116
Babbitt Metal, How to Melt	114
Baker Car Heater	46
Better Mechanical Devices Needed	135
Big Locomotives	69
Block System	65
Bridges, America's Famous	116
Buffalo Car Tracing Association	21
Cabinet Woods, George W. Read & Co	69
Canadian Pacific R. R., Work on	69
Capacity of Freight Cars	104
Car-Builders' Monthly Meeting	7, 15, 27, 39, 57
Car-Heater, The New Baker	81
Car-Heater, Saimon's Hot Water	26
Car Journal Box, Wendell's	17
Car Surface Painting	124
Cars Lighted by Electricity	10
Charcoal Iron for Car Wheels	100
Cleminson Flexible Wheel-Base	82
Color-Blind Problem	22
Confidence Game in Railroad Enterprises	118
Constitution and By-Laws, Master Car-Builders' Association	127
Cost of Standard Road Engine, Chicago & Alton R. R	30
Cost of Passenger Locomotive Truck, Chicago & Alton R. R	48
Couplers, Automatic, for Freight Cars	17
Decay of Decorative Art	65
Detailed Cost of Passenger Locomotive	18
Diversity in Locomotive and Car Construction	130
East River Suspension Bridge	65
Electric Light on Railroad Cars	110
Electric Signals, Working of	130
Electricity, Cars Lighted by	10
Engineer, A Courageous	26
Exhibit of Inventions at Car-Builders' Convention	84, 132
Fast Railroad Lines	55
First Passenger Train	2
Fitchburg Railroad, New Passenger Cars	101
Fitting Up Railroad Machine Shops	114
Flowers' Sleeping Car	17
Freight Car, Three-Truck	55
Freight Cars, Capacity of	104
Freight Cars, Carrying Capacity of	58
Freight Train Brakes, Report on	123
Freight Train Men, Protection to	34
Frogs, Accidents from	10
High Railway Speed	63
Injectors, Water Chambers for	60
Iron Frames for Cars	82
Iron Freight Cars, Tubular	21, 82
Iron Freight Car Trucks, Report on	124
Joint Meetings of M. M. and M. C. B. Associations	70
Kaolin for Locomotive Boiler Covering	42
Lake Shore & Michigan Southern Wheel Report	46
Libel on Conductors	34
Link Motion Valve Gear	20
Links and Pins, Proposed Standard for	8
Locomotive Building in England	130
Locomotive Performance, P. H. Dudley on	89
Locomotive, Standard Passenger, Chicago & Alton R. R	29
Locomotive Tender Truck, Wabash, St. Louis & Pacific	14
Locomotive Valve Gear	32
Locomotives, Big	69
Locomotives in the United States	99
Locomotives, Hauling Capacity of	46
Locomotives, Painting of	18
Luminous Paint	140
Luxury in New York	32
Master Car-Builders' Asso'n Constitution and By-Laws	127
Master Car-Builders' Association—10th Annual Convention	74, 86
Master Car-Builders' Association, Meeting at Niagara Falls	122, 141
Master Car-Builders' Association, Reorganization of	57
Master Car-Builders' Association, Subjects for Discussion	100
Master Car-Painters' Association	95, 99
Master Mechanics' Association	88
Merited Tribute, John C. Davis	69
Mogul and Ten-Wheel Engines, Trial of	68
Moore's Freight Car Door-Hanger	34
Necessity and Invention	65
New Chair Cars, C., B. & Q. R. R	86
New Passenger Cars, Fitchburg R. R	101
New Street Cars, John Stephenson Co	135
Nuts and Bolts	63
Official Car for Oregon R. R. & Nav. Co	2
Palace Stock Cars, Montgomery	116
Parallel Rods of Locomotives	103
Parlor Cars, Boston & Maine R. R	89
Passenger Cars, American and English	21
Passenger Cars, Construction of	110
Passenger Cars, New York, New Haven & Hartford R. R	118
Passenger Locomotive, Detailed Cost of	18
Passenger Trains in Germany	51
Pennsylvania Railroad Co.'s Report	43
Poking Fun at a Railroad	68
Postal Cars, Balt. & Ohio R. R	89
Precautions Against Accidents on Erie Road	65
Prepared Colors for Railway Paint Shops	110
Pullman Cars, The First	31
Railroad Operations in 1881	92
Railroad Traveling in Germany	129
Railroad Sociability	84
Railway, A Novel	27
Railway Improvements Needed	117
Railway Master Mechanics' Association	69
Railway Nuisance	68
Railway Passenger Trains in Germany	51
Railway Rolling Stock, Recent Reports of	51, 22, 29, 40, 69, 96
Railway Signals	144
Railway Stations, Rural	58
Railway Traveling in Egypt	81
Railway Traveling in Switzerland	104
Red Wood Timber, California	39
Removing Old Paint from Passenger Cars	111
Revelations of a Dead-Beat	96
Running Railway Trains on Sunday	99
Safety Car	68
Sand Blast Engraving	10
Screw-Threads, Report on	77
Sedimentary Deposits in Locomotive Boilers	7
Sleeping Car, Origin of	67
Sleeping Car, Flowers'	17
Standard Cattle Car, New York Central R. R	18
Standard Passenger Coaches, Baltimore & Ohio R. R	10
Steel Tire Car Wheels, Improved	17
Steel Railways, Cable System of	55
Straight Tread Car Wheels	135
Street Railway Men, Association of	144
Sweet Gum Timber	46
Switch Back Railroad, Mt. Pisgah	116
Tallman Automatic Freight Car Brake	124
Taste in Car Decoration	36
Throttle Valve Stories	92
Timber for Railroad Uses	111
Tires of Mixed Metals	135
The First Passenger Train	2
The Jaffa & Jerusalem Railroad	96
The Machinery Situation	96
The Night Train	68
The Term "Engineer"	66
Varnishing Passenger Car Bodies	134
Very Light Cars	130
Wagner, Webster, The Late	21
Wallumer Electric-Magnetic Brake	103
Wheel Report, Lake Shore & Michigan Southern Ry	46
Wheels, Comparative Merits of Iron and Steel	123
Wilson's Improved Freight Car	105
Wilson Slide Valve	31
Wootten Locomotive Fire-Box	88
Yard-Masters' Mutual Benefit Association	81
Yellow Pine	66

PARAGRAPH ITEMS.

	PAGE
Allen Paper Car Wheel Co	97
Albro, E. D. & Co., Cincinnati, O	2
American Brake Co	25, 98
Ash-Pan for Locomotive, Improved	2
Atwood Safety Nut	13
Baker Car Heater	85
Baltimore & Ohio R. R. Annual Report	2
Bergen Hill Cut, Jersey City	14
Black Walnut, Substitute for	63
Bushnell's Seat Springs	73
Boston & Albany R. R. Fast Express Passenger Cars	85
Boston & Albany R. R. Annual Report	1
Bowers, Dure & Co	73
Canadian Locomotive Engine Co	62
Cayuta Wheel & Foundry Co	13
Central Support Car Truck Co	97
Chesapeake & Ohio R. R. Shops	26, 72
Chicago Locomotive Works	1
Chilled Car Wheel Grinding Co	13, 19, 38
Cleaning Brass	66
Cochrane's Steel Rail Crossing	38
Conn. R. R. Commission—Car Couplers	1
Combination Cars, Boston & Albany R. R	14
Combination Freight Car, Wilson's	2
Cordesman, Egan & Co	97
Coupler, Car, Hohenstein's	50
Detroit Car Spring Co	85
Dining Cars, Pennsylvania R. R	50
Ensign Manufacturing Co	73
Extension Step for Cars, Improved	2
Freight Car, Miniature Model of	86
Freight Car Trucks, Virginia Midland Ry	57
Gill Car Manufacturing Co	22
Harlan & Hollingsworth Co	63, 62
Harrisburg Car Co	13
Hudson River Tunnel	98
Italian Railway Cars	84
Jones Car Mfg. Co	37
Jackson & Sharp Co	13, 61
Lafayette (Ind.) Car Co	13
Life Insurance, B. & O. R. R. Experiment	53
Locomotive Steam Reversing Gear	103
Marquette, Houghton & Ontonagon Shops	2
Mass. R. R. Commissioners on Punishing Employés	26
McQueen Locomotive Works	38
Middletown (Pa.) Car Works	26
Miniature Steam Engine	1
Mekarski Compressed Air Motor	1
Missouri Pacific Shops, at St. Louis	134
Montgomery Palace Stock Car Co	62
Mound City Paint and Color Co	45
Mt. Clare Shops, Baltimore & Ohio R. R	12
Narrow Gauge Freight Car Construction	131
National Car Co., St. Albans, Vt	25
New Coaches, Savannah, Florida & Western R. R	53
New York, Lake Erie & Western Report	26
Niles Tool Works	72
Norfolk & Western R. R., Officers' Car	45
North Carolina Car Co	48
Officers' Car, Norfolk & Western R. R	45
Paige's Wrought Metal Car Wheel	37
Paint, Renewing Without Burning Off	63
Parrott Varnish Co	37
Passenger Traffic on English Railways	14
Pennsylvania R. R. New Station in Phila	2, 50
Prosser Street Car	26
Pullman Palace Cars for New York, Chicago & St. Louis	130
Railroads in Massachusetts	37
Railway Miles per Square Mile	26
Rendle's Electric Paint Remover	84
Richmond, Fredericksburg & Potomac Cars	36
Salaries on Vanderbilt Roads	132
Screw-Lever Dump Car	13
Sleeping Cars, New York, New Haven & Hartford Railroad	63
Smoking Cars, Wisconsin Central Railroad	14
Snow-Plow, W. W. Osborne's Improved	2
Southern Pacific 60-ton Locomotive	25
Spear's Anti-Clinker Car Stoves	132
Speed Register, John C. Henry's	98
Springs for Passenger Car Trucks	48
Standard Locomotive, Cherokee Railroad	62
Steel Tire Wheel Mileage, Locomotives	19
Steel-Tired Car Wheels on Boston & Albany	14
Street Tramway Traffic in Great Britain	25
Tanite Emery Wheel Co	13
Telegraphing from a Moving Car	14
Tredegar Co., Richmond	25
Union Switch and Signal Co	14, 97
Virginia Midland Railroad Shops	26
Swissvale Car Works	50

ILLUSTRATIONS.

	PAGE
Arch-Bars, Machine for Bending	24
Carlines for Passenger Cars	140
Car Tenoning Machine	134
Car Wheel Boring Machine	38
Early English Railroads and Locomotives	139
Engine and Tender Trucks, Chicago & Alton R. R	40
Extension Smoke and Brick Arch, Cin., N. O. & Tex. Pacific R. R	141
Fast Freight Box Car, Rich. & Alleghany R. R	92
Feed-Water Heater and Purifier, Strong's	105
Four-Wheel Coal Car, Brighthope Ry	101
Freight Car Door-Hanger	34
Freight Car Truck, Richmond & Alleghany R. R	45
Gondola Car, New York, Ontario & Western R. R	136, 137
Grain Door for Freight Cars, Improved	21
Granger's System of Water Supply for Cars	110
Hand-Blower for Forges	12
How to Turn a True Ball or Sphere	103

4385

PAGE.

Improved Band-Sawing Machine 98
Iron Freight Car Trucks, Tests of 125
Kellogg's Improved Iron Car Truck 113
Kellogg's Iron Freight Car 112
Locomotive Brasses, Unequal Wear of 102
Locomotive Cab, Chicago & Alton R. R. 52
Locomotive Driving Boxes, Overhauling 54
Locomotive Driving-Coupling, Strong's 104
Locomotive, Passenger, Wabash, St. Louis & Pacific 4, 5, 6
Locomotive Spark Arrester, Nichols' 81
Locomotive Tender Truck, Wabash, St. Louis & Pacific 16
Locomotive Truck, Wabash, St. Louis & Pacific 17
Locomotive Valves, Setting of 90
Mack's Injectors 99
Mortiser and Borer, Heavy Car 51
Passenger Coaches Fitchburg R. R., Interior Finish of 140
Passenger Engine Tender and Tank, Chicago & Alton R. R. 32
Pile-Driving Car, Nichols' Self-Propelling 79
Salmon's Hot Water Heater for Railway Cars 26
Screw-Threads, Standard for Cars 77
Searles Heater for Railway Cars 135
Sedimentary Deposits in Locomotive Boilers 7
Standard Box Freight Car, New York Central R. R. 9
Standard Cattle Car, New York Central R. R. 19
Standard Coal Car, Richmond & Alleghany R. R. 44
Standard Passenger Car, Chicago & Alton R. R. 66
Standard Passenger Car Truck, Chicago & Alton R. R. 67
Standard Passenger Locomotive, Chicago & Alton R. R. 28
Standard Single and Double Dead-Blocks 107
Strong's Feed-Water Heater and Purifier 105
Strong's Locomotive Driver-Coupling 104
Stock Car, Richmond & Alleghany R. R. 56
Valve Gear for Locomotives 33
Water-Chambers for Injectors 60
Wilson's Combination and Improved Grain Car 117

EDITORIALS.

Accidents to Railway Employés 10
Business Circulars 11
Car-Coupling Inventions 107
Car Couplings in England and America 119
Car Wheels 94
Central Support Freight Car Truck 94
Color Blindness 83
Committees of Car-Builders' Association 47
Continuous Brakes in England 59
Contract Work and Rolling Stock 83
Freight Car Buffer-Blocks 95
Freight Car Springs 107

PAGE.

Freight Car Trucks 142
Freight and Passenger Traffic 106
Future Railroad Mileage 59
Graydon Safety Car Heating Apparatus 47
Initial Marks on Freight Cars 23
Iron Cars 23
Labor Strikes 59
Lessons of the Freight Handlers' Strike 106
Live Stock Transportation, Abuses of 70
Master Car-Builders' Association, Proposed Reorganization of 70
Mineral Wool 47
Montgomery Palace Stock Cars 119
Niagara Meeting of Car-Builders' Association 118
New Car Axle Lubricator 59
New Class of Records and Statistics Wanted 142
New York Railroad Commission 83
Paint as a Car Illuminator 120
Passenger and Freight Rates 119
Patents 119
Pintsch Method of Car Lighting 108
Railroad Accidents 131
Railway Free Passes 35
Responsibility and Punishment 35
Sleeping, Drawing-Room and Hotel Cars 71
Springs for Freight Cars 107
Spuyten Duyvil Accident, Report on 83
Standard Single and Double Dead-Blocks 107
Stoves and Lamps in Railway Cars 23
Suburban Passenger Traffic 11
Tantalizing Announcement 71
The "Car-Builder" and Railroad Working Men 23
The Car-Builders' Association and its New Departure 94
The Car-Builders' Convention 82
The Car-Builders' Association and Patented Devices 71
The Changed Condition of the South 22
The Master Car-Builders' Association 130
The Passenger Train Brakeman 108
The Spuyten Duyvil Calamity 22
The Westinghouse Brake 35
Thirty-Ton Freight Cars 59
Two Model Railroads 23
Ventilation of Passenger Cars 11

COMMUNICATIONS.

Blow-Back Accident on Pennsylvania R. R. 138
Boilers, Strength of 64
Brass, Effects of Temperature on 20
Car Construction, Some Suggestions on 20
Car Journal Boxes, Management of 115
Color-Blindness, Science and Nonsense 55

PAGE.

Dead-Blocks 115
Dynagraph and Train Resistance 91
Early English Railroads and Locomotives 138
Economical Management of Locomotives 42
Extended Smoke Arch, Economy of 126
Extended Smoke Arch of Locomotives 138
Floor Framing for Passenger Cars 126
Floor Timbers of Freight Cars, How to Protect 30
How to Turn a True Ball or Sphere 103
Keying Locomotive Main and Side Rods 43
Locomotive Boiler Joints 30
Locomotive Brasses, Unequal Wear of 102
Locomotive Driving Boxes, Overhauling 54, 101
Locomotive Machine Shop Foremen 138
Locomotive Valve Gear, Designing of 127
Locomotives and High Speed 126
Locomotive Driving Boxes, Overhauling 64, 80, 91
"M. C. B." Standard Axle and 30-ton Cars 102
Native Woods for Car-Building 91
Nuts, Forms of and Methods of Putting On 126
Passenger Locomotives and High Speeds 102
Railroad Machine Shops, Fitting Up 114
Railway Activity in Chicago 102
Railway Rolling Stock, the Building of 80
Railways and the Timber Supply 31
Repairing Broken Locomotive Cylinders 43
Rules for Interchange of Freight Cars 115
Through Sleeping Cars 80
Wood Ceilings for Passenger Cars 126

NEW PUBLICATIONS.

Ealy's Blue Book 24
Furniture Trade Journal 36
House Carpenters' Companion and Builders' Guide 132
Journal of Association of Engineering Societies 8
Oil and Drug News 36
Southern Lumberman 8
Southwestern Railway Advance 8
The Industrial Review 36
Travelers' Official Guide 24

BUSINESS NOTICES.

Artificial Leather 12
Boston Standard Wheel Co 60
Halladay Saw-Sharpener 95
Holt Manufacturing Co 60
Niagara Refining Co 48, 60
Phosphor Bronze Wire 12
The Tanite Co 13